



**STOPPING
WATER POLLUTION
AT ITS SOURCE**



**PROTOCOL FOR CONDUCTING
A
STORM WATER CONTROL STUDY**



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Report prepared by:

Water Resources Branch
Ontario Ministry of Environment and Energy

FOREWORD

This document constitutes a protocol for conducting a Storm Water Control Study (SWCS) in accordance with the requirements of the Effluent Limits Regulations issued under the Ontario Environmental Protection Act.

The protocol outlines:

- ♦ the role and responsibilities of the discharger;
- ♦ the exemption criteria that determine whether or not a study is required;
- ♦ the requirements that must be followed in conducting a study; and
- ♦ the requirements that must be followed in developing a control program.

The requirement to conduct a Storm Water Control Study (SWCS) as prescribed by the MISA Sector Effluent Limits Regulations applies to all dischargers listed in schedule 1 of the Regulations.

TABLE OF CONTENTS

FOREWORD	ii
PART I. INTRODUCTION	1
PART II. ROLE OF DISCHARGER	3
PART III. EXEMPTION CRITERIA	4
PART IV. STORM WATER CONTROL STUDY REQUIREMENTS	5

PART I. INTRODUCTION

As part of the strategy to meet the MISA goal of "virtual elimination" of persistent toxic contaminants from all discharges into Ontario waterways, control of contaminants in storm water runoff from industrial sites is required. The goal of storm water control is to reduce contaminant loadings to the maximum extent practicable and to ensure that storm water discharges are not-acutely lethal.

For the purpose of this document, storm water is defined as rain water runoff, snow melt, surface runoff and natural drainage from a plant site. Storm water discharges associated with industrial activity include but are not limited to discharges from drainage areas, drainage ponds, material handling sites, and raw material storage sites. Storm water which flows into process effluent which is then subjected to treatment is not storm water for the purposes of this protocol.

Most storm water drainage systems direct storm water and surface drainage towards natural receiving waters. While adequate for property protection and safety concerns, these practices could degrade the quality of receiving waters and result in reduction or loss of water uses where the storm water is contaminated.

Storm water discharges were monitored for all sectors, under the MISA Monitoring Regulations. In addition, information on site drainage was collected as part of an initial report submitted by each discharger. Through this work, the Ministry was able to obtain preliminary information on the potential loadings of contaminants to the environment.

The MISA Sector Effluent Limits Regulations do not set limits for storm water dischargers but require instead that each discharger shall conduct a Storm Water Control Study (SWCS). Under the study, the discharger will:

- determine the quantity and quality of storm water discharges;
- identify all known sources of storm water contamination;
- identify the need for controls based on the nature of the problem(s);
- evaluate prevention and control measures;
- prepare a Storm Water Management Report (SWMR).
- develop a storm water control program (SWCP) which identifies preferred prevention and control measures, if controls are needed.

This document outlines the steps that a discharger must follow when conducting a SWCS, and applies to those dischargers listed in schedule 1 of the MISA Sector Effluent Limits Regulation.

A discharger is relieved of the obligation to conduct a SWCS if the discharger meets the exemption criteria set out in Section III of this protocol.

As part of the SWCS, a discharger is required to prepare a SWMR which includes the results of the SWCS and the SWCP. The discharger, however, is not required to submit the report to the Ministry for approval. The discharger must keep the SWMR required by this protocol on file, and make the information available to the Ministry upon request.

Unless exempted from the requirement to complete a SWCS, the Ministry urges all the dischargers to implement the SWCP on voluntary basis, as expeditiously as possible, as a contribution towards a cleaner environment.

Implementation of a SWCP may result in the construction of sewage works, which will require the discharger to make an application for approval under the Ontario Water Resources Act. This Act defines "sewage works" to include storm sewers and storm water control facilities.

PART II. ROLE OF THE DISCHARGER

Unless exempt under Part III, it is the responsibility of a discharger:

- ♦ To comply with the requirements of the MISA Sector Effluent Limits Regulation by carrying out a SWCS within the time frame stipulated in the MISA Sector Effluent Limits Regulation.
- ♦ To ensure that all requirements outlined in this protocol document are followed.
- ♦ To collect the information required by this protocol, keep it on file, and make the information available to the Ministry for review upon request.
- ♦ To prepare a SWMR and SWCP

It is recommended that a discharger contact the appropriate municipality, Conservation Authority, or office of the Ministry of Natural Resources to determine if a watershed management plan is in place and, if so, whether the plan should be considered during the development of a SWCS.

Where a discharger meets the exemption criteria set out in this protocol, and is thereby relieved of the obligation to conduct a SWCS, the discharger must inform the "Director" in writing by _____, 199__, that the plant meets the exemption criteria.

(The date that is one year after the day on which the sector regulation is filed will be inserted)

PART III. EXEMPTION CRITERIA

The sector effluent limits regulation allows the discharger to be exempted from conducting a storm water control study provided that the discharger meets the criteria outlined below.

For the purposes of determining exempt status, large complex plants may choose to divide their sites into exempt and non-exempt areas where it is possible to clearly differentiate the two.

The criteria under which a discharger may claim exemption are:

a) (i) All storm water discharges, associated with the site or with the area for which the discharger is claiming exemption, are directed to a sewage works, for which a Certificate of Approval has been issued by the Ministry under the Ontario Water Resources Act, for collection, transmission, treatment and disposal;

(ii) All available storm water discharges, associated with the site or with the area for which the discharger is claiming exemption, mix with process effluent and are subsequently treated by facilities used for the treatment of process effluent streams;

(iii) A study that meets the requirements of this protocol has been completed within the last 5 years, no changes have been made to the plant since the completion of the study, and provided a SWMR is prepared and retained on file and made available to the Ministry upon request; and

b) Except in the case of (iii) above, the discharger retains on file and makes available to the Ministry upon request the following information:

(i) A schematic showing plant layout and collection systems for storm water;

(ii) All available storm water monitoring data, including measured or estimated storm water volumes relative to volumes of other plant discharges;

(iii) Calculated loadings of storm water discharges that are treated separately from the process effluents, for the same parameters as those listed in schedules 2 and 3 for the discharger's plant of the MISA Sector Effluent Limits Regulation; and

(iv) A description of existing treatment processes and site practices for the management of storm water discharges including the location and capacity of inputs, by-passes, treatment, retention, equalization, and recycling operations; as well as the

analyses of treated storm water quality, sampling schedules, and sampling and analytical procedures used.

PART IV. STORM WATER CONTROL STUDY (SWCS) REQUIREMENTS

The SWCS may vary with each plant site. As a minimum, to ensure that all areas of potential concern have been adequately covered, the discharger shall carry out the following activities:

1. Collect and analyze samples for at least eight representative storm events¹ from storm water outlets characteristic of the different plant areas (i.e. process, parking lots, storage, and loading and unloading of any raw material, intermediate products, finished products, byproducts or waste products) to define the contaminants found in storm water as well as the acute lethality of rainbow trout and Daphnia magna.

Two types of samples are required. The first is a "first flush grab sample" collected during the first 30 minutes of the storm event. The second type is a "flow-weighted composite sample" or "equal time equal volume composite sample" for the entire storm event.

A flow-weighted composite sample is defined as a composite sample obtained by automatic equipment which collects samples proportional to storm water flow at time intervals of 30 minutes or less over the sampling period. The number and volumes of samples are to be recorded. The equal time equal volume composite sample is defined as a composite sample obtained by automatic equipment which collects samples of equal volume at equal time intervals of 15 minutes or less over the sampling period. The number of samples and the volume taken is to be recorded.

Storm water samples shall be analyzed for the same parameters as those listed in schedules 2 and 3 for the discharger's plant of the MISA Sector Effluent Limits Regulation.

Grab samples for rainbow trout and Daphnia magna acute lethality testing shall be collected during the first 30 minutes of the

¹ Representative storm events are those events that are greater than five millimetres of rain as measured by a rain gauge within two kilometres of the plant or at an Environment Canada meteorological station within two kilometres from the plant.

storm. The rainbow trout and Daphnia magna acute lethality tests shall be performed according to the procedures described in the Environment Canada publications entitled "Reference Method for Determining Acute Lethality of Effluent to Rainbow Trout" dated July, 1990 and "Reference Method for Determining Acute Lethality of effluents to Daphnia magna " dated July 1990

2. Prepare a site map showing the outline of drainage areas served by each storm water sewer, process sewer, and cooling water sewer.

3. Estimate the monthly average rainfall, the total area drained by each sewer, as well as the total area of impervious surfaces on the site, including paved areas and building roofs.

4. Measure the volume of storm water discharged during representative storm events and assess the accuracy of methods used.

5. Identify by means of fluorometric dye tests or other tracer methods all sewers discharging untreated storm water that contain process or cooling water discharges and describe the method used and record, the date of testing, and the on-site drainage points that were directly observed during a test.

6. Calculate loadings of untreated storm water discharges for the same parameters as those listed in schedules 2 and 3 for the discharger's plant of the Sector Effluent Limits Regulation.

7. prepare a SWMR the content of which shall contain, as a minimum, the following information:

- a. A record of the result of each activity required by paragraphs 1 to 6 of Part IV of this protocol.
- b. Identification of all known potential sources of storm water contamination and typical contaminants.
- c. A description of significant materials that are currently treated, stored or disposed of on site in a manner which may cause storm water contamination.
- d. A description of control measures that are used to reduce contamination of storm water.
- e. A comparison of the loadings resulting from each representative storm water events with the daily plantloadings from process effluent and cooling water streams, for the same parameters as those listed in schedules 2 and 3 column 2 for the discharger's plant of the MISA Sector Effluent Limits Regulation.

f. Results of the rainbow trout and Daphnia magna acute lethality testing of storm water effluent streams and the potential sources of the lethality.

8. Evaluate prevention and control alternatives, that considers, as a minimum, the following measures:

a) Prevention alternatives:

- i. Interception of storm water in and around areas of storage, loading and unloading of any raw material, intermediate products, finished products, by-product or waste product;
- ii. Reduction of the accumulation and/or deposition of debris;
- iii. Control of the discharge from roofs or other catchment areas;
- iv. Control of contamination through the separation of interconnected collection systems;
- v. Inclusion of reuse/recycling of storm water for industrial purposes;
- vi. good housekeeping (i.e. spill cleanup), and employee training and education.

b) Control alternatives:

- a. Oil/grit separator;
- b. Sedimentation facilities;
- c. Storm water retention ponds that meet a minimum treatment level of sedimentation for a 24 hour retention period during the runoff produced by 25 millimetres of rainfall in a 6 hour period;
- d. Biological treatment systems;
- e. Screening;
- f. Spill control;
- g. Infiltration techniques (where applicable); and,
- h. Decontamination of soils, waste materials, etc.

9. Develop a SWCP based on evaluation of the measures for prevention and control. The program shall include, at a minimum, the following elements:

- a. Preferred methods for achieving storm water control at the discharger's plant.
- b. Timetable and costs for implementation of preferred methods; and,
- c. Monitoring of each storm water effluent during at least 2 representative storm events per year for the parameters listed in column 2 of Schedules 2 and 3 for the discharger's plant of the MISA Sector Effluent Limits Regulation and recording of sampling and analysis results.

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